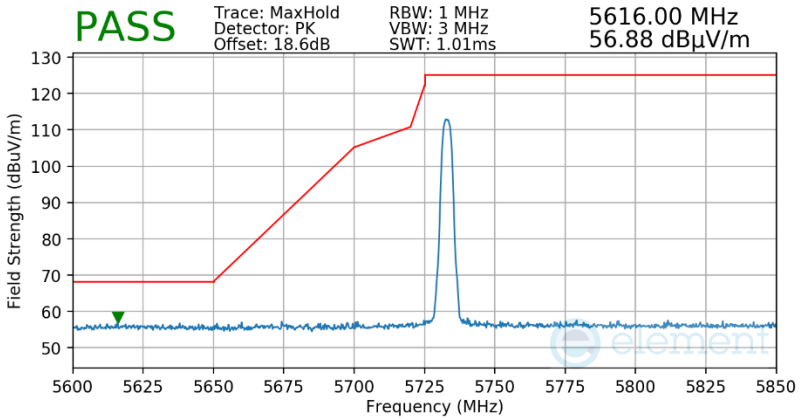
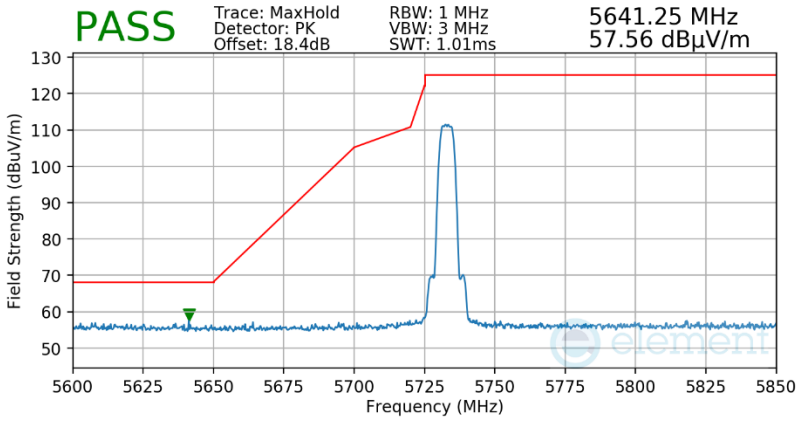
Mode:	HDR4
Power Scheme	ePA
Measurement Distance:	3 Meters
Operating Frequency:	5733MHz



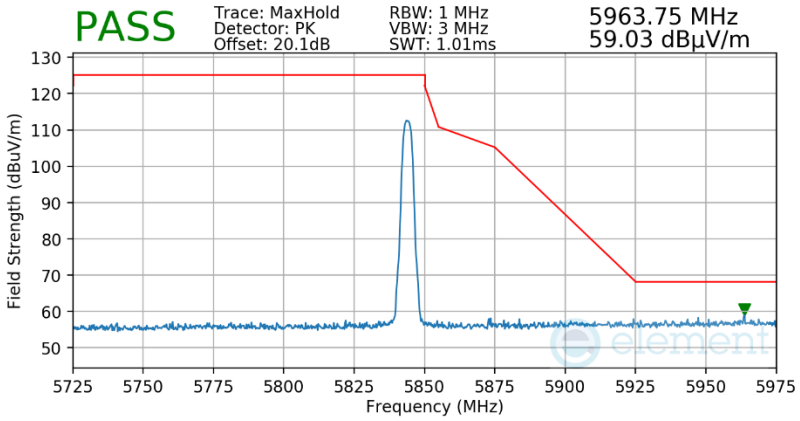
Plot 7-151. Radiated Lower Band Edge Measurement

Mode:	HDR8
Power Scheme	ePA
Measurement Distance:	3 Meters
Operating Frequency:	5733MHz



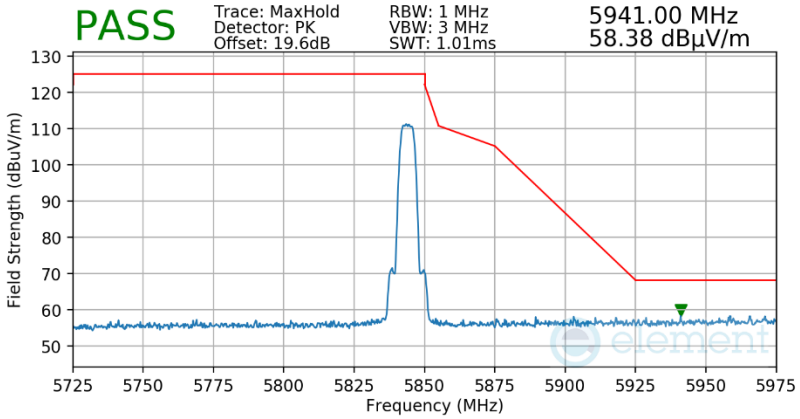
Plot 7-152. Radiated Lower Band Edge Measurement

Mode:	HDR4
Power Scheme	ePA
Measurement Distance:	3 Meters
Operating Frequency:	5844MHz



Plot 7-153. Radiated Upper Band Edge Measurement

Mode:	HDR8
Power Scheme	ePA
Measurement Distance:	3 Meters
Operating Frequency:	5844MHz



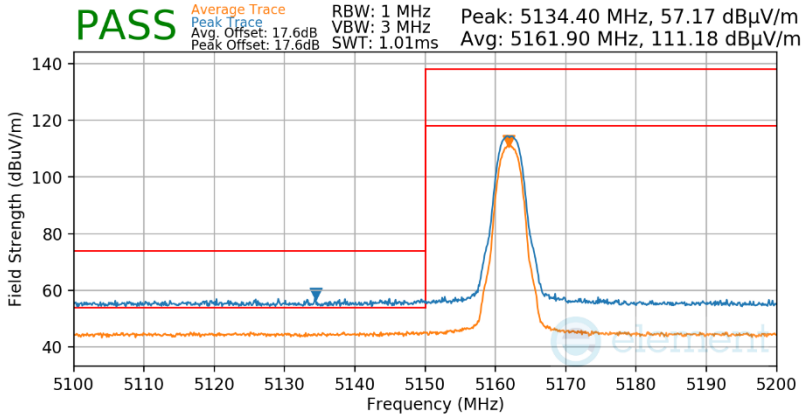
Plot 7-154. Radiated Upper Band Edge Measurement

TxBF

The amplitude offset shown in the following plots for average measurements was calculated using the formula:

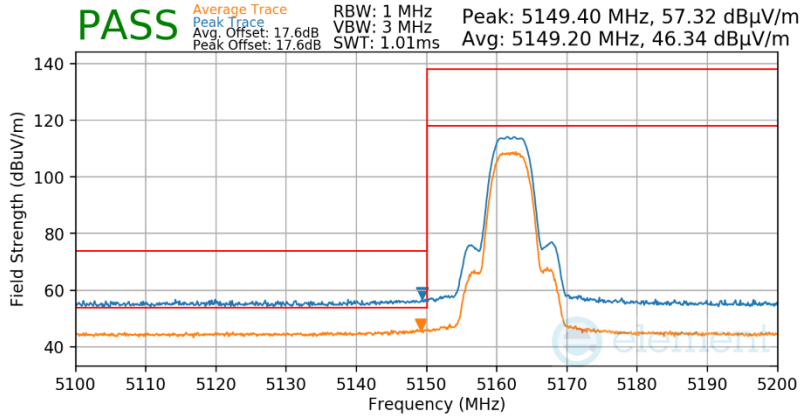
Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

Mode:	HDR4
Power Scheme	ePA
Measurement Distance:	3 Meters
Operating Frequency:	5162MHz



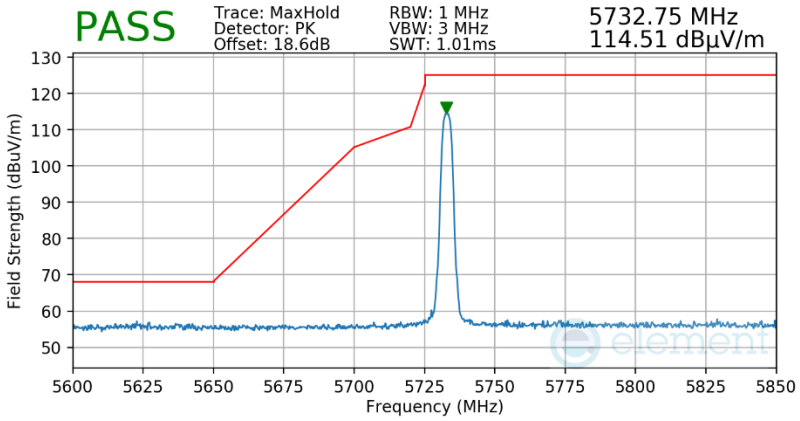
Plot 7-155. Radiated Lower Band Edge Measurement

Mode:	HDR8
Power Scheme	ePA
Measurement Distance:	3 Meters
Operating Frequency:	5162MHz



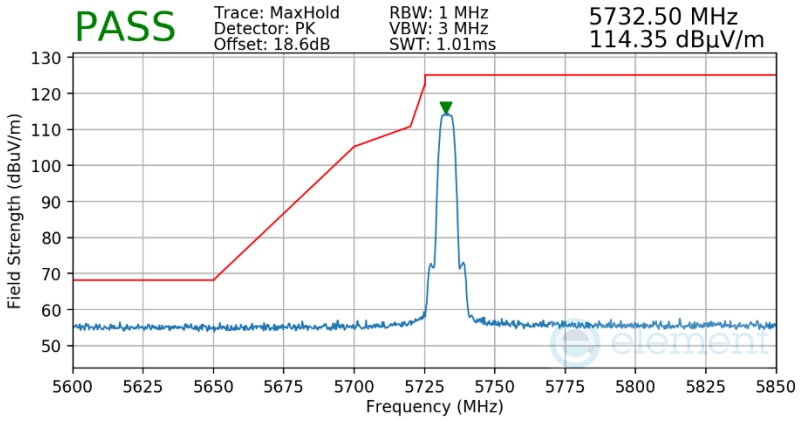
Plot 7-156. Radiated Lower Band Edge Measurement

Mode:	HDR4
Power Scheme	ePA
Measurement Distance:	3 Meters
Operating Frequency:	5733MHz



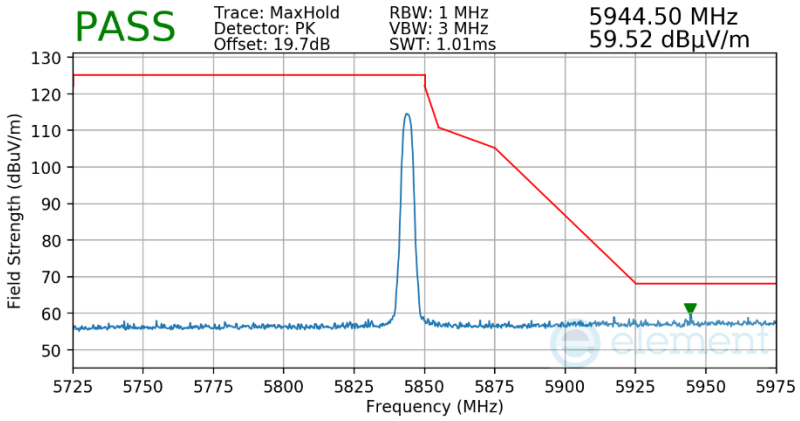
Plot 7-157. Radiated Lower Band Edge Measurement

Mode:	HDR8
Power Scheme	ePA
Measurement Distance:	3 Meters
Operating Frequency:	5733MHz



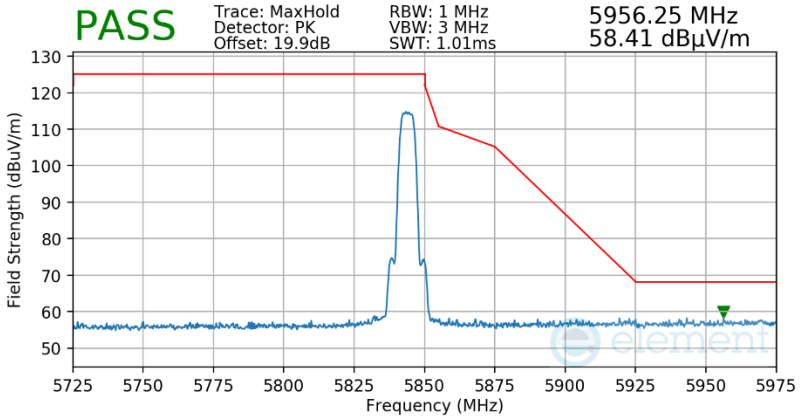
Plot 7-158. Radiated Lower Band Edge Measurement

Mode:	HDR4
Power Scheme	ePA
Measurement Distance:	3 Meters
Operating Frequency:	5844MHz



Plot 7-159. Radiated Upper Band Edge Measurement

Mode:	HDR8
Power Scheme	ePA
Measurement Distance:	3 Meters
Operating Frequency:	5844MHz



Plot 7-160. Radiated Upper Band Edge Measurement

7.7 Radiated Spurious Emissions – Below 1GHz

§15.209

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 7-34 per Section 15.209.

Frequency	Field Strength [µV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 7-34. Radiated Limits

Test Procedures Used

ANSI C63.10-2013

Test Settings

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. VBW = 300kHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagrams below.

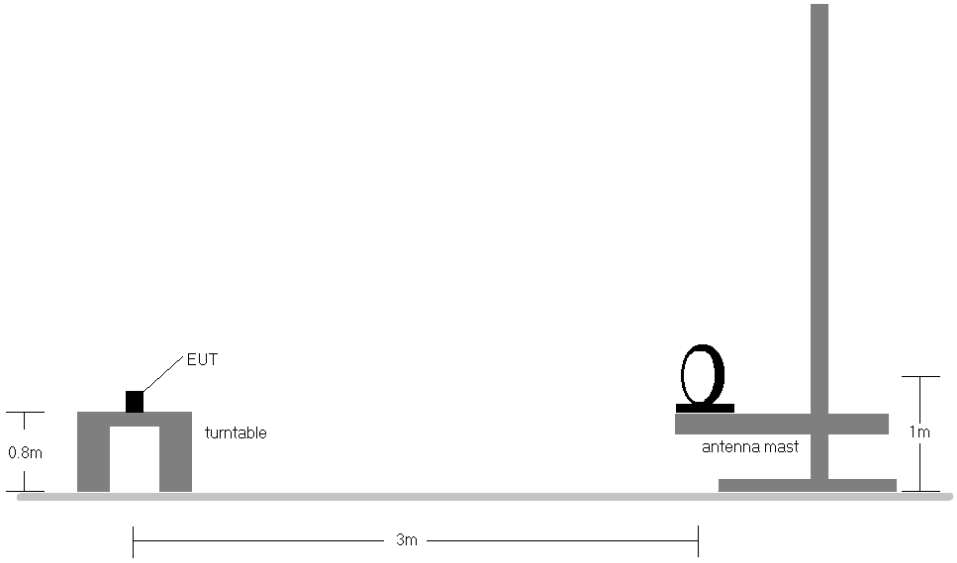


Figure 7-6. Radiated Test Setup < 30MHz

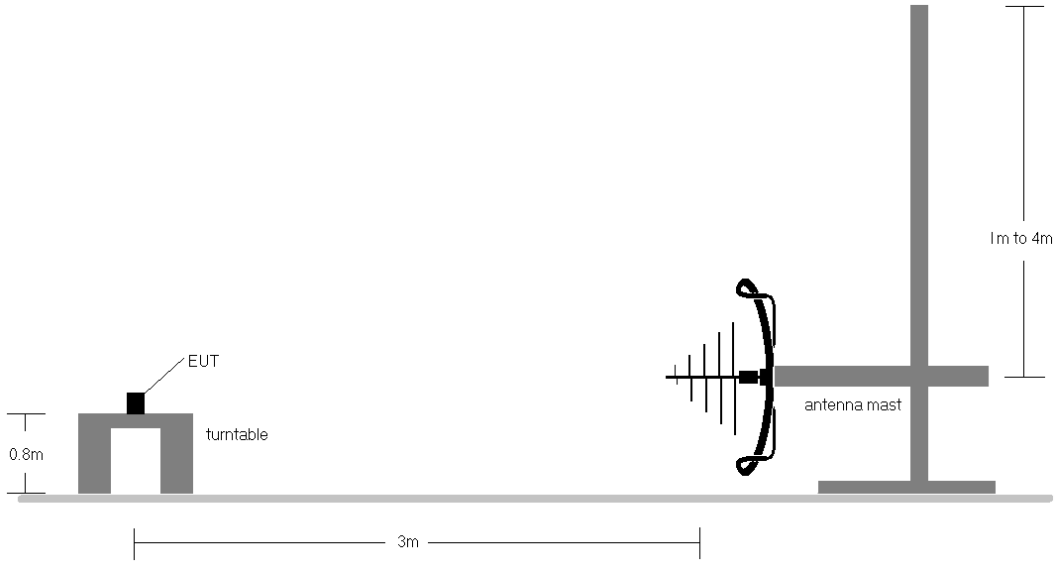


Figure 7-7. Radiated Test Setup < 1GHz

Test Notes

1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-34.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes. For below 30MHz the loop antenna was positioned in 3 orthogonal planes (X front, Y side, Z top) to determine the orientation resulting in the worst case emissions.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector for emissions within 6dB of the limit.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
9. All supported modulation have been tested on the unit and only worst case configuration is reported.
10. Both configurations below were investigated, and the worst case has been reported.
    a. EUT charged by charging case and powered by AC/DC adaptor with lightning cable.
    b. EUT charged by charging case and powered by host PC with lightning cable

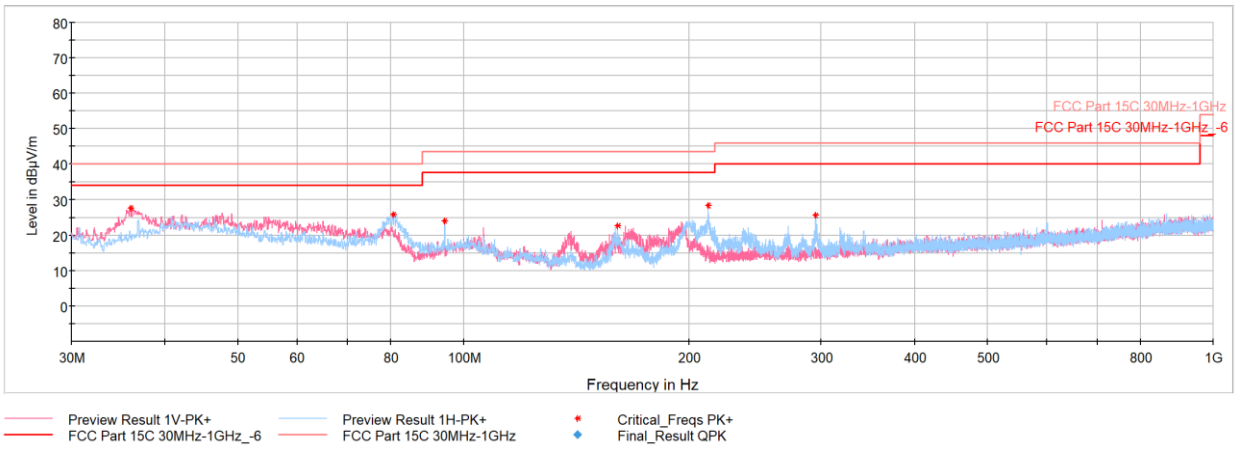
Sample Calculations

Determining Spurious Emissions Levels

- Field Strength Level $_{[dB\mu V/m]}$ = Analyzer Level $_{[dBm]}$ + 107 + AFCL $_{[dB/m]}$
- AFCL $_{[dB/m]}$ = Antenna Factor $_{[dB/m]}$ + Cable Loss $_{[dB]}$ – Preamplifier Gain $_{[dB]}$
- Margin $_{[dB]}$ = Field Strength Level $_{[dB\mu V/m]}$ – Limit $_{[dB\mu V/m]}$

TxBF Radiated Spurious Emissions (Below 1GHz)

§15.209



Plot 7-161. RSE 30MHz - 1GHz TxBF (HDR4 – 5245MHz), with AC/DC Adapter

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
35.97	Max Peak	V	100	157	-60.84	-18.46	27.70	40.00	-12.30
80.54	Max Peak	H	200	138	-58.23	-22.85	25.92	40.00	-14.08
94.46	Max Peak	H	200	285	-63.85	-19.06	24.09	43.52	-19.43
160.51	Max Peak	H	100	253	-63.88	-20.41	22.71	43.52	-20.81
212.02	Max Peak	H	100	163	-60.76	-17.96	28.28	43.52	-15.24
294.96	Max Peak	H	100	130	-66.10	-15.35	25.55	46.02	-20.47

Table 7-35. RSE 30MHz - 1GHz TxBF (HDR4 – 5245MHz), with AC/DC Adapter

7.8 AC Line Conducted Emissions Measurement

§15.207

Test Overview and Limit

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for AC Line conducted spurious emissions. All data rates and modes were investigated for AC Line conducted spurious emissions.

All conducted emissions must not exceed the limits shown in the table below, per Section 15.207.

Frequency of emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

Table 7-36. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10-2013, Subclause 6.2

Test Settings

Quasi-Peak Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Average Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

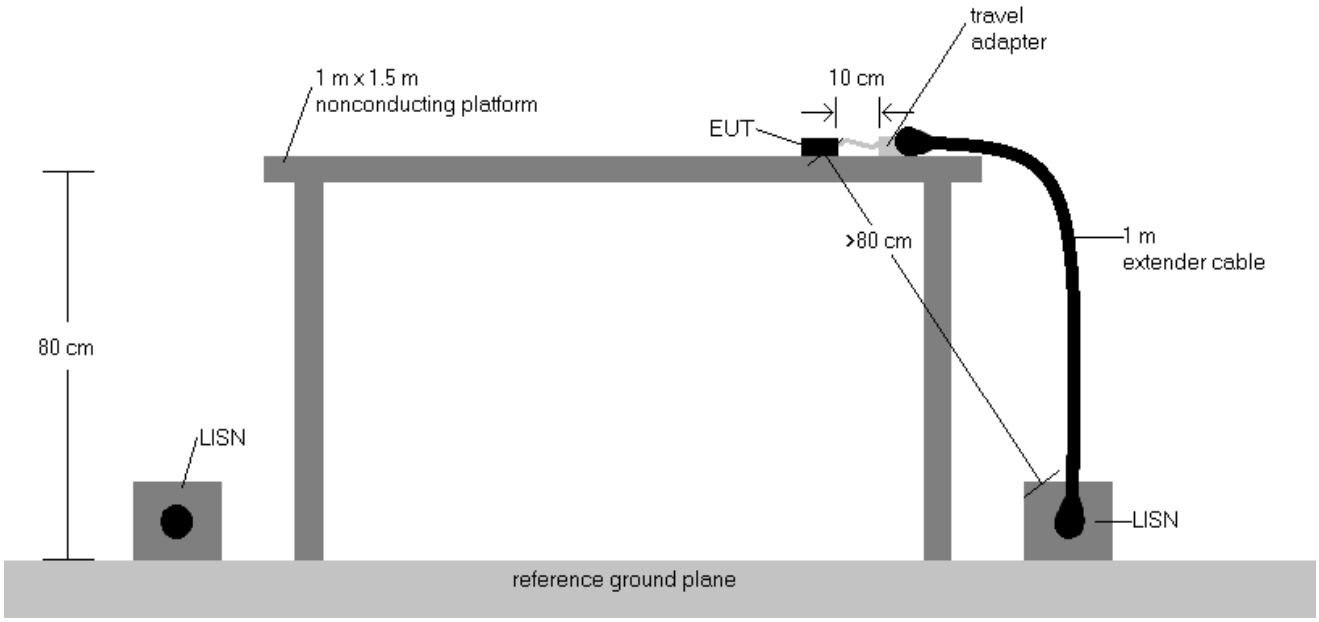
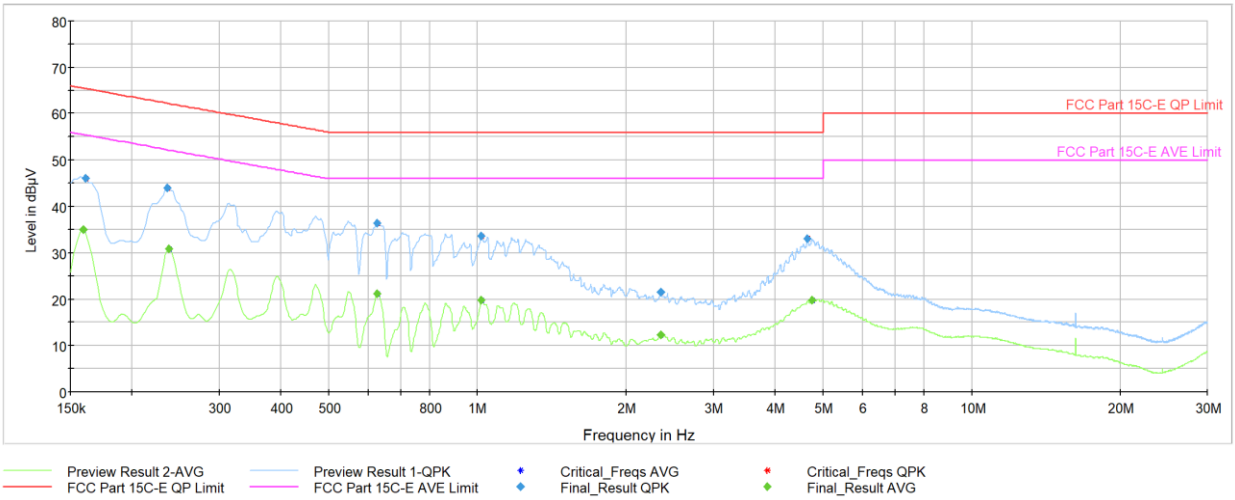


Figure 7-8. Test Instrument & Measurement Setup

Test Notes

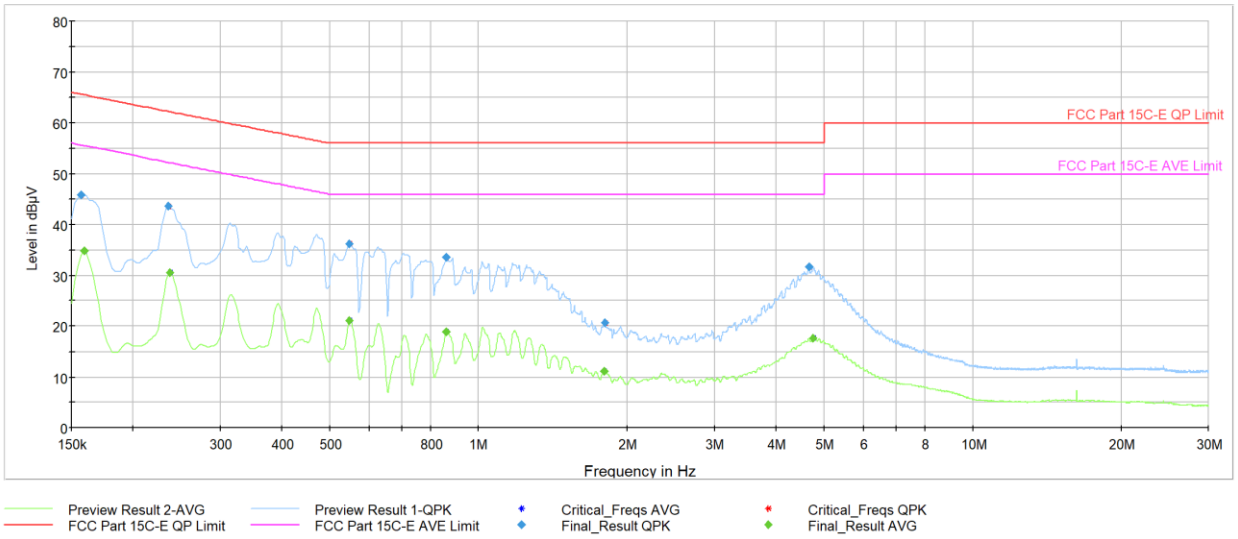
1. All modes of operation were investigated and the worst-case emissions are reported. The emissions found were not affected by the choice of channel used during testing.
2. Both configurations below were investigated, and the worst case has been reported.
    a. EUT charged by charging case and powered by AC/DC adaptor with lightning cable.
    b. EUT charged by charging case and powered by host PC with lightning cable.
3. The limit for an intentional radiator from 150kHz to 30MHz are specified in 15.207.
4. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
5. QP/AV Level (dBμV) = QP/AV Analyzer/Receiver Level (dBμV) + Correction Factor (dB)
6. Margin (dB) = QP/AV Level (dBμV) - QP/AV Limit (dBμV)
7. Traces shown in plots are made using quasi-peak and average detectors.
8. Deviations to the Specifications: None.



Plot 7-162. AC Line Conducted Plot (HDR4 – 5245MHz) (L1) with AC/DC Adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.159	FINAL	—	34.97	55.52	-20.55	L1	GND
0.161	FINAL	46.1	—	65.40	-19.27	L1	GND
0.236	FINAL	44.0	—	62.25	-18.26	L1	GND
0.238	FINAL	—	30.81	52.17	-21.37	L1	GND
0.627	FINAL	36.4	—	56.00	-19.65	L1	GND
0.627	FINAL	—	21.19	46.00	-24.81	L1	GND
1.019	FINAL	33.5	—	56.00	-22.46	L1	GND
1.019	FINAL	—	19.77	46.00	-26.23	L1	GND
2.346	FINAL	—	12.35	46.00	-33.65	L1	GND
2.348	FINAL	21.6	—	56.00	-34.45	L1	GND
4.652	FINAL	33.1	—	56.00	-22.91	L1	GND
4.751	FINAL	—	19.82	46.00	-26.18	L1	GND

Table 7-37. AC Line Conducted (HDR4 – 5245MHz) (L1) with AC/DC Adapter



Plot 7-163. AC Line Conducted Plot (HDR4 – 5245MHz) (N) with AC/DC Adapter

Frequency [MHz]	Process State	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Line	PE
0.157	FINAL	45.9	—	65.63	-19.75	N	GND
0.159	FINAL	—	34.78	55.52	-20.73	N	GND
0.236	FINAL	43.6	—	62.25	-18.63	N	GND
0.238	FINAL	—	30.56	52.17	-21.61	N	GND
0.548	FINAL	36.3	—	56.00	-19.75	N	GND
0.548	FINAL	—	21.10	46.00	-24.91	N	GND
0.861	FINAL	33.5	—	56.00	-22.47	N	GND
0.861	FINAL	—	18.90	46.00	-27.10	N	GND
1.795	FINAL	—	11.25	46.00	-34.75	N	GND
1.797	FINAL	20.6	—	56.00	-35.41	N	GND
4.655	FINAL	31.7	—	56.00	-24.33	N	GND
4.745	FINAL	—	17.60	46.00	-28.40	N	GND

Table 7-38. AC Line Conducted (HDR4 – 5245MHz) (N) with AC/DC Adapter

8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Apple Tablet Device FCC ID: BCGA2435** is in compliance with is in compliance with Part 15 Subpart E (15.407) of the FCC Rules.

9.0 APPENDIX A

Antenna gains provided by manufacturer.

Antenna Gains

Frequency (MHz)	Horizontal (dBi)	Vertical (dBi)
5180	3.7	1.0
5260	3.6	0.9
5320	3.4	1.0
5500	3.1	0.4
5600	3.3	-0.4
5700	3.5	0.2
5745	3.7	0.5
5785	3.7	1.0
5825	4.0	1.8
5955	4.2	2.4
6075	3.9	1.9
6135	3.9	1.5
6255	4.1	1.9
6375	4.2	1.8
6435	4.3	2.0
6555	3.4	1.4
6675	4.2	2.8
6735	4.1	3.3
6855	4.7	2.4
6975	4.2	2.0
7035	4.1	2.4
7115	4.1	3.0

Table 9-1. WiFi [5GHz/6GHz] / NB UNII (Antenna 5b); Type: Cavity Backed

Frequency (MHz)	Horizontal (dBi)	Vertical (dBi)
5180	1.5	2.4
5260	1.4	2.3
5320	2.0	2.8
5500	0.1	0.7
5600	-0.5	-0.1
5700	-1.0	0.1
5745	-1.1	0.3
5785	-1.1	-0.2
5825	-2.1	-0.1
5955	-4.0	-0.7
6075	-3.7	-0.9
6135	-2.3	-0.6
6255	-1.1	0.6
6375	-0.5	1.0
6435	-0.3	1.2
6555	-0.7	-0.3
6675	-1.9	-1.6
6735	-1.9	-1.5
6855	-2.4	-2.7
6975	-3.3	-4.8
7035	-4.9	-5.9
7115	-4.9	-6.2

Table 9-2. WiFi [5GHz/6GHz] / NB UNII (Antenna 4a); Type: IFA